



Vermont Better Roads Grant Program Application

Please complete one application per category and/or project you are applying for. You may make copies of the application for multiple applications per category and/or multiple categories.

Please check the Category you are applying for:

- ☐ B. Correction of a Road Related Erosion Problem and/or Stormwater Mitigation Retrofit for both gravel and paved roads
- ☐ C. Correction of a Stream Bank or Slope Related Problem
- ☒ D. Structure/culvert upgrades

Town/Organization: West Haven

Project Name: Main Road Culvert

Road Name: Main Road TH #: 1 Structure # (if applicable): 7

Road Type: Paved Uncurbed

Class 2

Watershed: According to Hydraulic report, Hilly drainage basin equal to 0.25 sq. miles.

Please provide a thorough description of the problem (ex. Roadway has steep slope with no ditch which is causing roadway erosion):

4 FT corrugated steel structure that is in critical condition. The invert is rotted through for the entire 100 FT length of structure, moderate deterioration of outlet headwall, failure is imminent.

Description of Project and how you plan to complete the work (ex. Stone line 500' of ditch by reshaping ditch and stone lining, working from the top of the project down to the bottom):

According to hydraulic report the recommended sizing of structure is 3 FT diameter. In that the existing structure is 4 FT in diameter this is a good candidate for sleeving. The project will consist of sleeving the existing structure and repairing the deteriorated portions of the headwalls.

Expected Effects (+ & -) on water quality (ex. Erosion will be eliminated by placing the stone ditch):

Erosion will be eliminated by repairing the rotted invert of structure and scour protection.



Distance from end of project to nearest water (stream, lake, or stormwater system that outlets directly to water). 0-50'

Progress to Date:

Hydraulic Study complete, consultation with DEC engineer complete, cost estimate complete

Is there an emergency reason this project must be completed quickly? If yes, please explain:

The project should be completed this year as the culvert is deteriorated to the extent that storm water runoff is running outside the walls of the structure.

Has this project been identified through a municipal road inventory, capital budget plan, tactical basin plan, culvert inventory, or other management plan? If yes, please list which.

☒ Yes: In culvert inventory completed in conjunction with RPC

☐ No

Please list any professionals you may have contacted for assistance with this project (ANR River

Management Engineer, Army Corps of Engineers, VTrans District Technical staff, Basin Planner etc.):

Josh Cavarjal, DEC River Engineer

Todd Eaton, Vermont Local Roads

Brian Sanderson, District 3 Project Manager

Is the project located in the town "Right of Way?" Yes, No, Both (if "Both" please explain further).

Yes.

Will the town road crew complete this work? Yes, No, Some (if "some" please explain further).

Some.

Town crew will be responsible to place sleeve material, repair deteriorated concrete headwalls, point in both ends of sleeve, place fill pipes for groat material, and any inlet outlet stone work. Subcontractors will include a hired excavator with operator and concrete contractor to pump flowable fill for groat.



Describe how the grant funds will be spent and/or attach a project budget:

See attached cost estimate

How do you plan to meet the required 20% match on this grant?:

Town crew time and material will suffice in 20% match

Requested Grant Amount (\$20,000 max Category B, \$40,000 max Categories C & D): \$ 8,320.00

Estimated Total Project Cost (including 20% local match): \$ 10,400.00

Estimated Completion Date: 10/01/2016

REQUIRED ATTACHMENTS:

- ☒ Itemized Cost Estimate (labor, equipment, materials)
(For assistance, call Better Backroads at 802-828-4585)
- ☒ Project Location Map
(Please show location of affected water; 1:12,000 USGS map, if possible)
- ☐ Sketch of proposed erosion control measures, including:
 - ☐ Distances (ft.)
 - ☐ Estimate of waste & borrow quantities
 - ☐ Approx. location of town/other right-of-way and/or property lines
- ☒ Photo(s) of the project area.
- ☐ Agreement for Entry and/or Deed of Easement (if project is outside Town ROW).
- ☒ If project involves stream or river/road conflict, include documentation of consultation with a River Management Engineer.
- ☐ Other appropriate supporting documents.

By signing this application I certify that all the information provided is accurate to the best of my knowledge. We will comply with all the requirements of the grant including making our books available for audit if required.

SIGNATURE OF APPLICANT: (Must be Town Administrator/Manager or Select Board Chair)

Name:

Leland Ellis chair

Title:

Select Board Chair

VLR/ Town Project Repair Estimate

LOCATION OF PROJECT: N 43.6399- W 73.3094

DESCRIPTION OF DAMAGE: Culvert in Critical Condition

Report No.
Inspection Date
Route #

WH-01
3/9/2016
TH-01

DESCRIPTION OF REPAIR: Sleeve

PREPARED BY: Todd Eaton

COST ESTIMATE

Pay Item	Unit	Description of work	Quantity	Unit Price	Cost
	HR	EXCAVATOR W/ OPERATOR	14	125	\$1,750.00
	LF	SLEEVE MATERIAL	100	\$40.00	\$4,000.00
	CY	FLOWABLE FILL	3	\$250.00	\$750.00
	LS	FORMING MATERIALS	1	\$1,000.00	\$1,000.00
	LS	PUMP TRUCK	1	\$1,000.00	\$1,000.00
	LS	DEC PERMITTING	1	\$200.00	\$200.00
613.10	CY	STONE FILL TYPE I	10	10	\$100.00
630.15	HR	FLAGGERS	16	\$100.00	\$1,600.00

SubTotal

\$10,400.00

West Haven Culvert_TH 1 Main Road

Carvajal, Joshua

Mon 3/14/2016 4:11 PM

To: Kyle Ellis <krellis1982@hotmail.com>;

Cc: Eaton, Todd <Todd.Eaton@vermont.gov>;

Kyle

Thanks for meeting with me to discuss this project and the requirement for coverage under the Stream Alteration General Permit (SAGP).

Lining of the existing CMP pipe arch will be suitable for this site and will need to include outlet protection to reduce downstream scour as well as bypass pumping of stream flows to reduce water quality impacts.

The reporting form will need to be completed and the \$200 fee submitted to Montpelier. This form is available at http://www.watershedmanagement.vt.gov/rivers/docs/SA/Stream%20Alt%20Application_11052015.pdf

Once the form is received, authorization under the Stream Alteration General Permit will be issued and we will need to coordinate a pre-construction meeting prior to commencing construction on the project.

Thanks and let me know if you have any questions.

Josh Carvajal, P.E. CFM
Rivers Program
Agency of Natural Resources
Department of Environmental Conservation

cell: (802) 490-6163

www.watershedmanagement.vt.gov/rivers.htm
floodready.vermont.gov

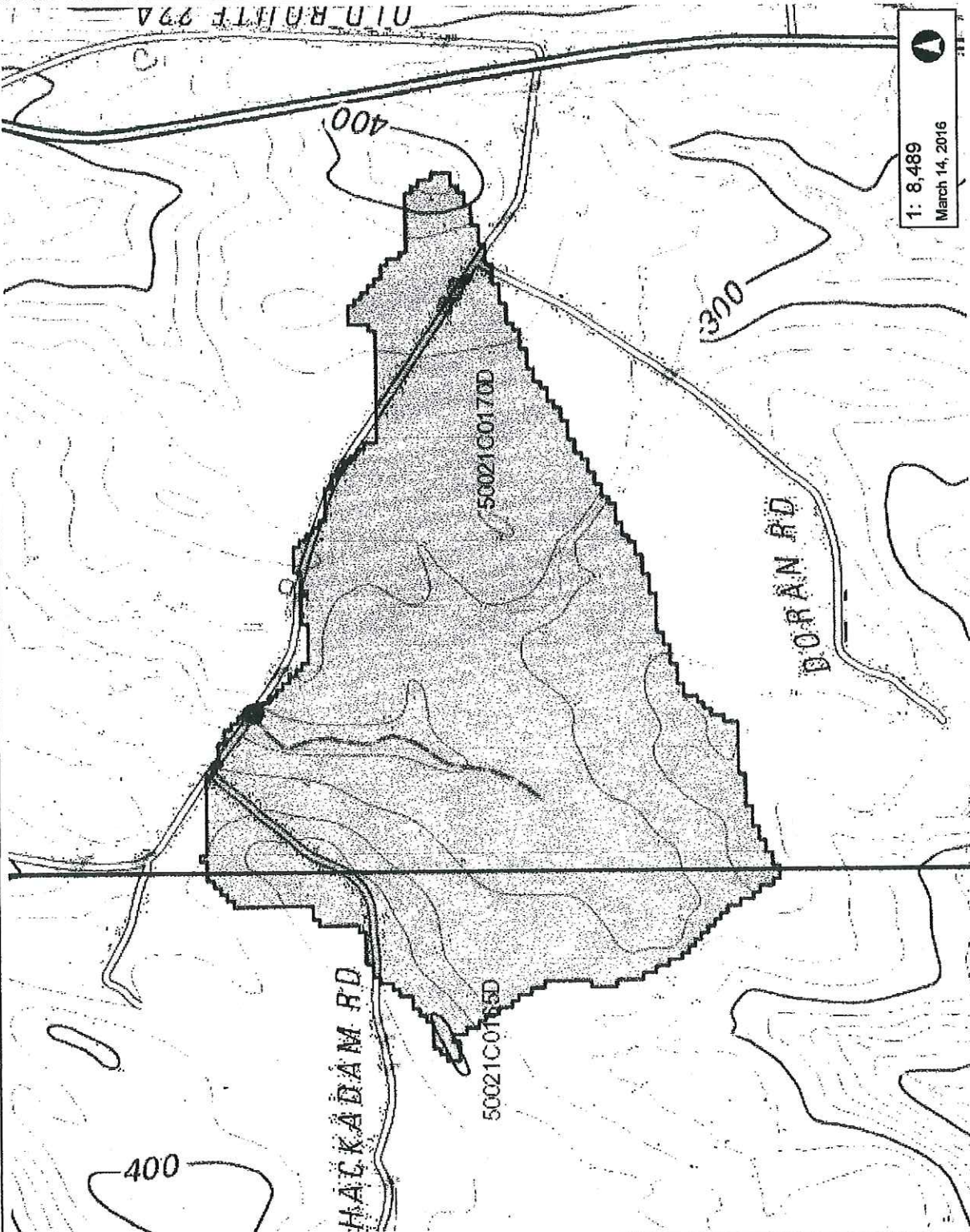
Our email addresses have changed (@vermont.gov)
NEW: joshua.carvajal@vermont.gov
Please update your address book!
!



West Haven_TH 1 Main Rd Watershed

Vermont Agency of Natural Resources

vermont.gov



1: 8,489

March 14, 2016

LEGEND

- River Corridor Easement
- DFIRM Panels
- DFIRM Floodways
- DFIRM Preliminary Floodways
- Special Flood Hazard Areas (A Counties)
- AE (1-percent annual chance flood)
- A (1-percent annual chance flood)
- AO (1-percent annual chance zone feet)
- 0.2-percent annual chance flood ha
- Special Flood Hazard Areas (F DFIRM)
- AE (1-percent annual chance flood)
- A (1-percent annual chance flood)
- AO (1-percent annual chance zone feet)
- 0.2-percent annual chance flood ha
- River Corridors (Jan 2, 2015)
- Small Streams - 50ft Setback
- Buildings (E911)
- VTRANS State and Town Long
- VTRANS State Short Structure
- Town Bridge
- Town Culvert
- Waterbody
- Stream
- Parcels (where available)
- Town Boundary

NOTES

Map created using ANR's Natural Resources Atlas

DISCLAIMER: This map is for general reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable. ANR and the State of Vermont make no representations of any kind, including but not limited to, the warranties of merchantability, or fitness for a particular use, nor are any such warranties to be implied with respect to the data on this map.

431.0 Meters

216.00

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WGS_1984_Web_Mercator_Auxiliary_Sphere

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THIS MAP IS NOT TO BE USED FOR NAVIGATION

1"= 707 FL 1cm= 85 Meters

Kyle

VT AGENCY OF TRANSPORTATION

PROGRAM DEVELOPMENT DIVISION

HYDRAULICS UNIT

TO: Brian Sanderson, District 3 Project Manager
FROM: Leslie Russell, P.E., Hydraulics Project Manager
DATE: 1 December 2015
SUBJECT: West Haven TH 1 (Main Road) over unnamed brook
Site just east of TH 13 (Hackadam Road)
GPS coordinates: N 43.6399° W 73.3094°

We have completed our hydraulic study for the above referenced site, and offer the following information for your use:

Hydrology

This site has a hilly drainage basin. It is a mixture of forest and fields. The total contributing drainage area is about 0.25 sq. mi. The stream slope at the site was estimated to be about 1% upstream and 3% downstream. Using several hydrologic methods, we selected the following design flow rates:

<u>Annual Exceedance Probability</u>	<u>Flow Rate in Cubic Feet per Second</u>
<u>(% AEP)</u>	<u>(CFS)</u>
43	15
10	25
4	30 - Local Road Design Flow
2	35
1	40 - Check flow

Channel Morphology

The channel is flat to moderate gradient. There is likely very little coarse sediment transport at the site due to the wetland upstream. Field measurements of bankfull width varied from 4' - 8' upstream. There is not a defined channel downstream past the scour pool. The Vermont Hydraulic Geometry Relationships anticipate a bankfull width of 7' for stream channels in equilibrium at this watershed size. Those curves may not be valid for this size drainage area. No indications of active vertical or horizontal instability were observed.

Existing Conditions

The existing structure is a 4' corrugated metal pipe that provides 12.6 sq. ft. of waterway area. There are cradle headwalls at the inlet and outlet of the pipe. The pipe is deteriorating under the road with the invert completely rusted through. There is a drop at the outlet of the pipe.

Our calculations, field observations and measurements indicate the existing structure does meet the current standards of the VTrans Hydraulic Manual and it does meet state stream equilibrium standards for bankfull width (span length).

This structure results in a headwater depth of 2.5' at 4% AEP and 2.9' at 1% AEP.

Liner Comments

A 3' pipe can be installed inside this pipe and still be hydraulically adequate. This will provide 7.1

sq. ft. of waterway area and have headwater depths of 2.9' at 4% AEP and 3.7' at 1% AEP. Outlet velocities will be higher than existing and the drop at the outlet will be higher. So scour at the outlet may increase with this option. Also, water will pond higher at the inlet with this option due to the higher inlet invert elevation.

Replacement Recommendations

In sizing a new structure we attempt to select structures that meet both the current VTrans hydraulic standards, state environmental standards with regard to span length and opening height, and allow for roadway grade and other site constraints.

Based on the above considerations and the information available, we recommend any of the following structures as a replacement at this site:

1. A concrete box with a 4' wide by 3' high inside opening that provides 12 sq. ft. of waterway area. This structure will result in a headwater depth of 2.0' at 4% AEP and of 2.5' at 1% AEP, with no roadway overtopping up to 1% AEP.
2. A 49" wide by 33" high corrugated metal pipe arch that provides 8.9 sq. ft. of waterway area. This structure will result in approximate headwater depth of 2.2' at 4% AEP and of 2.7' at 1% AEP, with no roadway overtopping up to 1% AEP. This pipe should not be under more than 11' of fill.
3. A 4' diameter corrugated pipe, with 12.6 sq. ft. of waterway area. This structure will result in a headwater depth of 2.5' at 4% AEP and of 2.9' at 1% AEP.
4. Any similar structure with a minimum clear span of 4' and at least 9 sq. ft. of waterway area, that fits the site conditions, could be considered.

Prior to any further action toward implementation of any of the above recommendations, structure size and type must be confirmed, and may be modified, by the VT ANR River Management Engineer to ensure compliance with state environmental standards for stream crossing structures.

Other regulatory authorities including the US Army Corps of Engineers may have additional concerns or requirements regarding replacement of this structure.

General Comments

If a new box is installed, we recommend it have full headwalls at the inlet and outlet. The headwalls should extend at least four feet below the channel bottom, or to ledge, to act as cutoff walls and prevent undermining.

If the pipe arch or round pipe is installed, concrete headwalls should be constructed at the inlet and outlet. The headwalls may be either half height or full height. The headwalls should extend at least four feet below the channel bottom or to ledge, to prevent undermining of the structure. We recommend a minimum cover of 3' over all pipe structures. Obtaining the minimum cover of 3' should be no problem at this site. Pipe manufacturers can provide specific recommendations for minimum and maximum fill heights and required pipe thickness.

It is always desirable for a new structure of this size to have flared wingwalls at the inlet and outlet, to smoothly transition flow through the structure, and to protect the structure and roadway approaches from erosion. The wingwalls should match into the channel banks. Any new structure should be properly aligned with the channel, and constructed on a grade that matches the channel. A new structure should span the natural channel width.

Stone Fill, Type II should be used to protect any disturbed channel banks or roadway slopes at the structure's inlet and outlet, up to a height of at least one-foot above the top of the opening. The stone fill should not constrict the channel or structure opening.

Please note that while a site visit was made, these recommendations were made without the benefit of a survey and are based on limited information. The final decision regarding replacement of this structure must comply with state regulatory standards, and should take into consideration matching natural channel conditions, roadway grade, environmental concerns, safety, and other requirements.

Please contact us if you have any questions or if we may be of further assistance.

LGR

cc: Josh Carvajal, A.N.R. River Management Engineer
Hydraulics Project File via NJW









